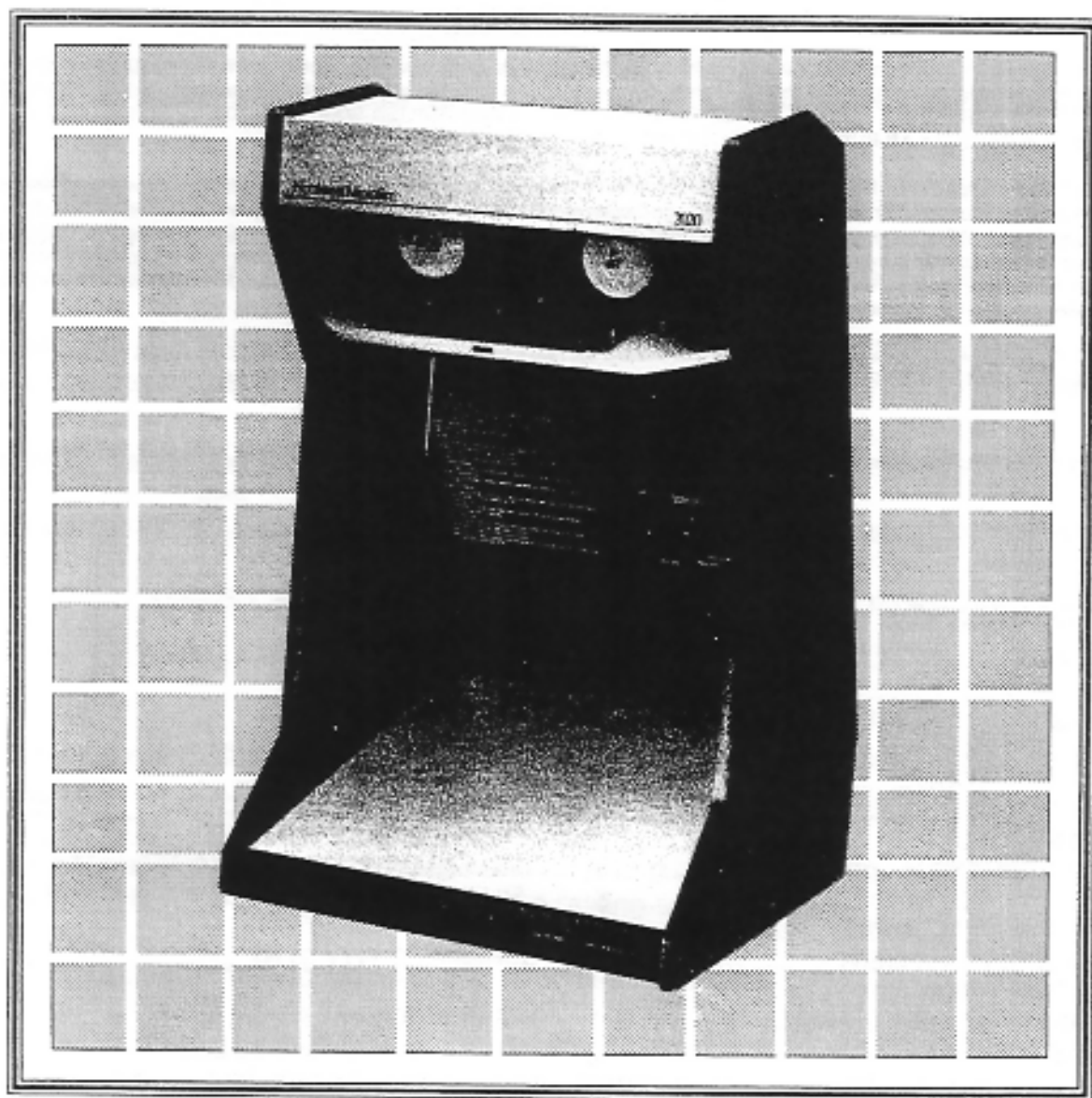


NORTHWEST MICROFILM



2020 & 2020A
16mm/35mm
ROLL FILM READERS

UNPACKING
OPERATION
MAINTENANCE
PARTS LIST

WARRANTY

Microimage Display grants a limited warranty only to the original User/Customer who purchase this product from an authorized Microimage Display dealer that his product is free from defects in material and workmanship under normal use, service, and preventive maintenance in accordance with Microimage Display instructions. The period of warranty time shall be as follows:

All Flat Film READERS: One (1) year from date of delivery to the original User/Customer (parts only).
(Note: This excludes flat film reader/printers.)

All other Microimage Display Products: Ninety Days (90) from date of delivery to the original User/Customer (parts only.)

Microimage Display's obligation and liability under this limited warranty shall be solely to repair or replace at Microimage Display's discretion any parts which are determined by Microimage Display to be defective within the applicable limited warranty period. **NO OTHER WARRANTY, EXPRESSED OR IMPLIED, SHALL APPLY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR TITLE WHICH ARE EXPRESSLY DISCLAIMED.**

This warranty shall not apply to the following: glass breakage, lamp failure, paper, toner, or other parts or expendable items which require repair or replacement due to normal wear and tear or to Microimage Display product's which have been subjected to accident, misuse or negligence, including the use of supplies or materials which are not technically satisfactory for use in a specific Microimage Display product. Microimage Display shall not be liable for consequential, indirect, incidental or special damages and shall not be liable for any damages whatsoever (including attorney fees) resulting from malfunctions or interruption of any type whatsoever in the operation or function of Microimage Display products whether based on contract, in tort, or otherwise, or for loss of goodwill.

FOR WARRANTY CLAIMS, THE USER/CUSTOMER SHOULD CONTACT THE AUTHORIZED MICROIMAGE DISPLAY DEALER SALES OFFICE WHO SOLD THE EQUIPMENT OR THE MICROIMAGE DISPLAY CUSTOMER SERVICE DEPARTMENT.

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SHIPPING DAMAGE

Northwest Microfilm Library readers are carefully inspected, tested, and packaged prior to shipment. Unpack and note condition of your reader immediately for possible damage or loss in shipment.

Safe delivery of your reader is the responsibility of the carrier. Any cost of in-transit visible or concealed damage must be recovered within a certain time from the carrier by the consignee. If reader appears damaged, notify your carrier immediately.

NORTHWEST MICROFILM

IMPORTANT

BE SURE TO READ OPERATING INSTRUCTIONS PRIOR TO USING YOUR READER.

Please unpack and inspect for damage.

Your reader was carefully inspected, tested, and packaged prior to shipment. Unpack and note condition of your reader immediately for possible physical damage or loss in shipment.

Safe delivery of your reader is the responsibility of the carrier. Any cost of in-transit visible or concealed damage must be recovered within a certain time from the carrier by the consignee.

IF YOUR READER IS DAMAGED

Save the container, all packing material and call the delivering carrier agent for inspection.

UNPACKING AND ASSEMBLY INSTRUCTIONS:

NMI 2020

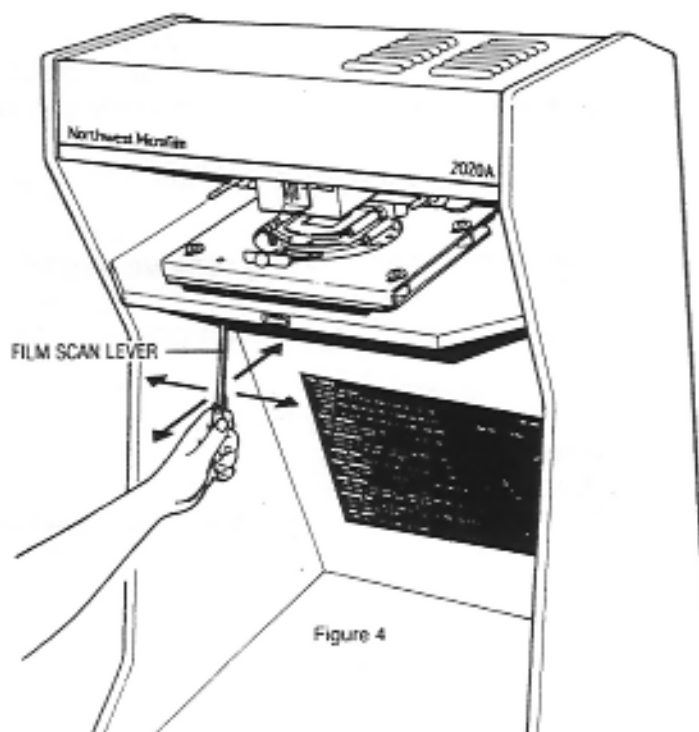
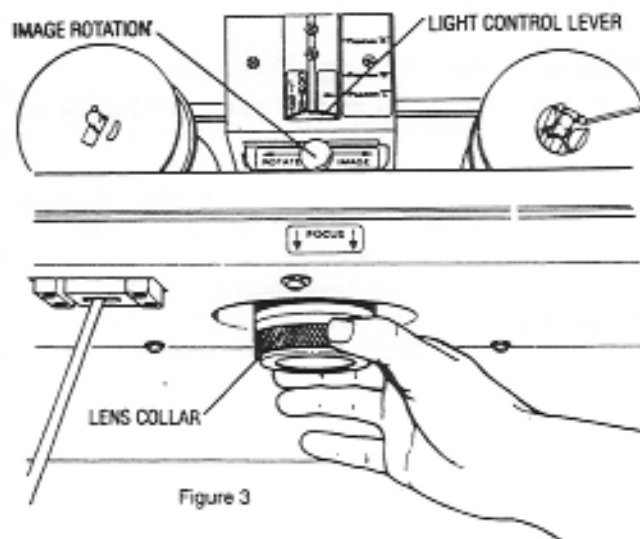
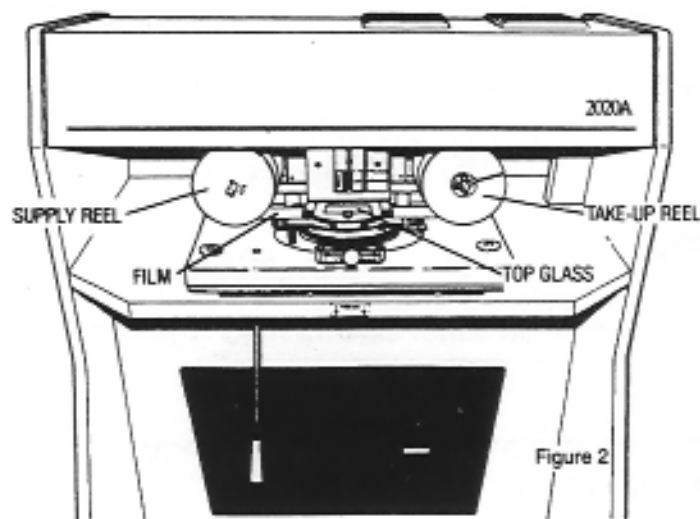
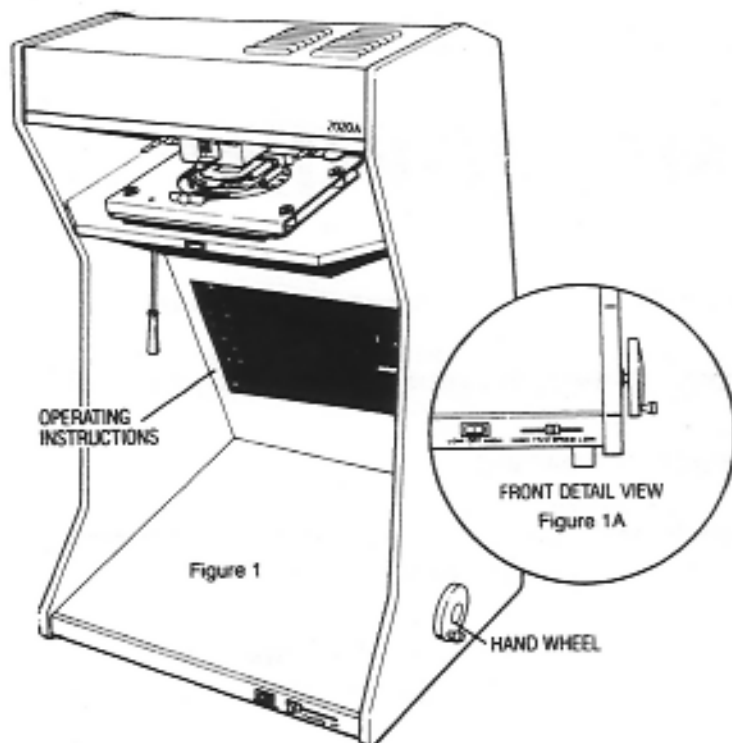
1. Remove packing filler from top of unit and lay box down on either side marked "FRAGILE HANDLE WITH CARE."
2. Open bottom of carton by cutting tape and removing bottom packing. Remove corrugated fillers from the side of the unit opposite the resting surface.
3. Push or pull on remaining side fillers to slide unit out of box.
4. Set unit upright and carefully remove all packing from roll film housing. Raise unit top cover and open lid on right side of light housing. Remove tape from mirror clips and take all remaining packing material out of light housing.
5. Close the light housing lid and carefully close the unit cover. Reader is now ready for operation.

NOTE: Refer to service manual for step-by-step operating procedures.



GUIDE TO OPERATION

1. **ON/OFF SWITCH.** The Micron 2020 has a three position switch (High, Off, Low) located on the lower right front corner of the viewing screen. (Figure 1A)
2. **LIGHT CONTROL.** Adjust light control lever to corresponding letter on lens. (Figure 3)
3. **FILM LOADING.** Lift top glass to open position. Place loaded supply reel on left hand spindle. Place empty take-up reel on right hand spindle. Thread film between upper and lower rollers per operating instructions located on the panel above the screen. Insert end of film into slot on take-up reel. Advance film. (Figure 2)
4. **FILM ADVANCEMENT.** To advance film, turn hand wheel clockwise. To rewind film turn hand wheel counterclockwise. (Figure 1)
5. **FILM SPEED.** To change speed of film advancement, shift Film Speed Lever to LOW for slow film advancement or to HIGH for fast film advancement or rewinding. (Figure 1A)
6. **FOCUSING IMAGE.** Focus image by rotating lens collar, located under film transport assembly on the lens. The focus is similar to a camera lens. (Figure 3)



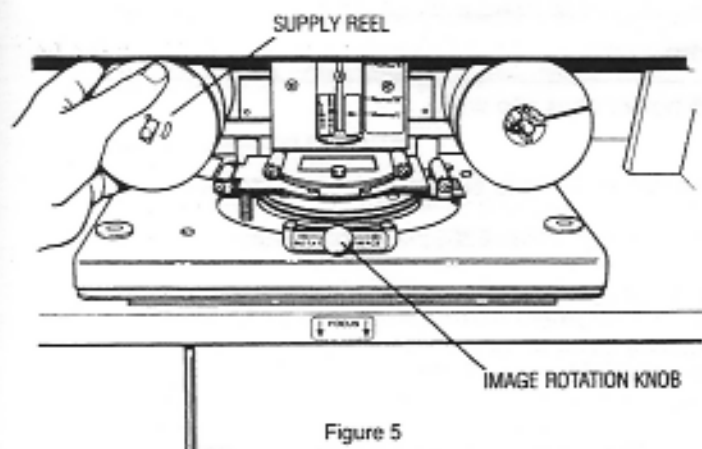


Figure 5

7. **IMAGE POSITIONING.** If image is not centered on screen, grasp film scan lever, and adjust vertically or horizontally. (Figure 4)
8. **IMAGE ROTATION.** When image is oriented up side-down or sideways, grasp image rotation knob and rotate image to desired position. (Figure 3) Stops are located every 90°.
9. **REMOVING FILM.** Rewind all film to the left-hand supply reel, by turning the hand wheel counterclockwise. Then grasp the left-hand supply reel and pull it straight off of the spindle. (Figure 5)

SPECIFICATIONS

Shipping Weight: 152 pounds (69 Kg.)

Dimensions: 25" deep (635 mm)
24-5/8" wide (625 mm)
41-1/2" high (1054 mm)

Illumination: 90 watts quartz halogen lamp with dichroic reflector. Two intensity settings: low, high.

Optics: Objective lenses; fully automatic 35mm F/2.8 wide angle lens standard. Optional lenses, 24mm for 16mm film or to over blow at 26X, 28 - 55mm zoom lens 15X - 24X for either 35mm or 16mm film. 16.5mm 42X for 16mm film the only lens of it's type available.

Adjustable: Condenser lens; fresnel, plastic 2-3/8" F/1, 60mm.

Screen: Front projection 23" X 23" viewing surface (584 X 584mm). Screen slanted at 15° to facilitate easy reading. Easy to clean formica type material. Replaceable in the field.

Electrical: 120 volt 60 cycle domestic, 240 volt 50 cycle foreign.

Film Transport: Unique NMI design reduces film scratching, accepts aperture card and film splices.

Focus Control: Located on the lens. Under film transport assembly. Constant corner to corner focus.

Image Rotation: Full 360° image rotation. Detents located at every 90° rotation.

Film Drive: Two speed manual drive system for fast or slow scan and rewind.

Film Loading: Operational schematic located above the screen on back panel makes functions, loading etc., easy for the operator.

Construction: High pressure laminate, aluminum and plastic.

Warranty: One year on all parts except screen, lamp and glass. Ninety days on labor.

Certification: UL approved.

Transport Options: Automatic Opening Glass Flats. Glass flats open whenever the film is moved forward or backward. Virtually eliminates film scratching.

Optional Lenses: Call with your specific requirements.

CLEANING PROCEDURES

1. Display screen may be cleaned with any non-abrasive, non-petroleum household cleaner. Care should be taken not to use strong solvents or cleaners on the cabinet.
2. Upper glass may be removed by unscrewing the small hex head screw which is located front/center of top glass bracket. A wrench is provided in the cleaning kit for this purpose. The lower glass can be removed by placing the upper glass in the "open" position, place 2 fingers on bottom of the glass surface, then push lower glass down and slide it toward the front of the machine.

Glass flats can be cleaned by using a lens brush or a household cleaner and a soft lint free cloth.

Replace glass flats. Please note that the glass surfaces must be parallel for the proper viewing of your film.

3. To clean lens, remove lens guard. Grasp the portion of the lens closest to the beige mounting platform and twist clockwise. The lens should be cleaned only with a photogenic lens cloth or a soft brush. Replace the lens and guard.

LAMP REPLACEMENT

1. Disconnect reader from power source.
2. Allow lamp and lamp cover to cool prior to changing lamp.
3. Open lamp and condenser housing and lift lamp box cover (located inside) to the vertical position.
4. Remove lamp from lamp bracket and socket.
5. Replace used lamp with new model DED, 13.8 volt, 85 watt lamp. (P/N 6230)
6. Return lamp cover and housing to their original positions.

TROUBLE SHOOTING GUIDE

Problems:	Probable Cause:	Remedy:
1. No light	a. Power cord not plugged into wall receptacle. b. Lamp not plugged into socket. c. Lamp burned out.	a. Plug power cord into wall. b. Make certain lamp is securely placed in socket. c. Replace lamp. (P/N 6230)
2. Light is on but no image on screen.	a. Light path blocked. b. Front surface mirror broken or missing. c. No objective lens.	a. Check light path. b. Order replacement mirror (refer to page 12, item 7 of service manual for part number). c. Order objective lens. (Refer to page 13, item 44 of service manual for part number.)
3. Image not clear on screen.	a. Film not threaded properly. b. Dirty objective lens. c. Dirty upper and lower glass. d. Lower glass misaligned. e. Image is out of focus.	a. Thread film per diagram above viewing screen. b. Remove lens guard and turn lens clockwise to remove, clean lens with a lint free cloth and replace lens. c. Remove screw from upper glass. (Refer to page 14, item 16 of service manual). Remove upper glass and clean with optical cleaner and lint free cloth. To remove lower glass, place forefinger on lower glass, push down and slide it towards you. Remove and clean with optical cleaner and lint free cloth. d. Position lower glass properly into lower glass support assembly. e. Turn focus ring on lens (Refer to diagram on page 3 - Figure 3).
4. Supply reel or take-up reel will not turn.	a. Upper or lower drive belts have come off of the pulleys. b. Film threaded improperly. c. Drive shaft disconnected or set screws are loose on universal joint or pulleys. d. Drive belt is loose.	a. Place upper or lower reel belt back on pulley. b. Refer back to 3-A remedies. c. Remove front panel and viewing screen. See page 7. Reconnect drive shaft to transport. Tighten set screws located on pulleys and universal joint. Refer to page 10. d. Move bearing support bracket toward rear of unit until belt is tight.
5. Image not centered on screen.	a. Supply and take-up reels not secured on shaft properly. b. Film scan lever not adjusted properly.	a. Push reels all the way back on shaft between proper ball detents on shaft. b. Adjust scan lever until image is in desired position.
6. Image is upside-down or sideways.	a. Image rotation is not in proper position.	a. Move image rotation knob located on the front of the film transport until image is in desired position.
7. Top glass does not automatically lift when handle is moved.	* a. P.C. board is defective.	a. Notify your authorized dealer for service.
8. Film rolls off one side faster than the other side can take it up.	a. Incorrect tension on the side of the reel which is rolling off.	a. Tighten the spring loaded clutch tensioner on front pulley. (Refer to page 14, item 34) and page 8).
9. Handle is more difficult to turn one way than the other.	a. Front reel tensioner too tight on roll off side.	a. Loosen up clutch tensioner on rear pulley. (Refer to page 14, item 34 and page 8).

* 2020A ONLY

INSTRUCTIONS FOR REPLACING THE UPPER BELT ON THE MODEL 2020

TOOLS NEEDED: One Phillips Screwdriver

(See Illustration on page 14)

1. Grasp image rotation handle and rotate 180°. The image rotation handle should now be pointing to the back of the unit. Rear pulley cover should now be facing you.
 2. Remove two(2) screws (item 27) and rear pulley cover.(item 48)
 3. Grasp old belt and pull it towards you to remove. *NOTE: Be careful when pulling belt out not to catch belt on glass retaining spring. (item 10)*
 4. Turn your image rotation handle 90° so the image rotation handle is pointing to the left side of the unit.
 5. Slide a spring hook under lower glass retainer (item 10). Hook belt and pull belt under item 11 and over lower pulley. The belt is then put around lower pulley.
 6. Keep tension on belt and rotate the image rotation handle 90° so it is facing the back of the unit. (Image rotation handle should be in the same position it was in step 1.)
 7. Make sure that the belt is between the two (2) idler pulleys (item 26).
 8. Put belt around left and right upper pulleys (item 69).
 9. Put rear pulley cover back on. (item 48).
-

LOWER BELT REPLACEMENT

(See Illustrations on Pages 10 and 13)

1. Remove the back panel (item 30) and two screws. (item 32)
2. Remove U-joint from top of the rear drive shaft. (item 21)
3. Remove the scan rod. (item 52) and four screws. (item 47, Illustration on Page 13.
4. Remove the lens guard, lens (item 46, Page 13) and three screws.(item 45)
The lens is threaded into an insert attached to the film transport. Grasp the top of the lens firmly and twist in clockwise direction.
5. Remove transport deck by locating and removing three Phillips screws.
(item 67, page 13)
6. Place transport deck on firm, flat surface, upside down. Replace the lower belt. Be sure to thread the belt between the two idler pulleys.

Reassemble and install transport deck, lens, lens guard, scan rod and back panel.

REEL ASSEMBLY REMOVAL INSTRUCTIONS

This procedure will allow clutch maintenance to be performed easier and faster.

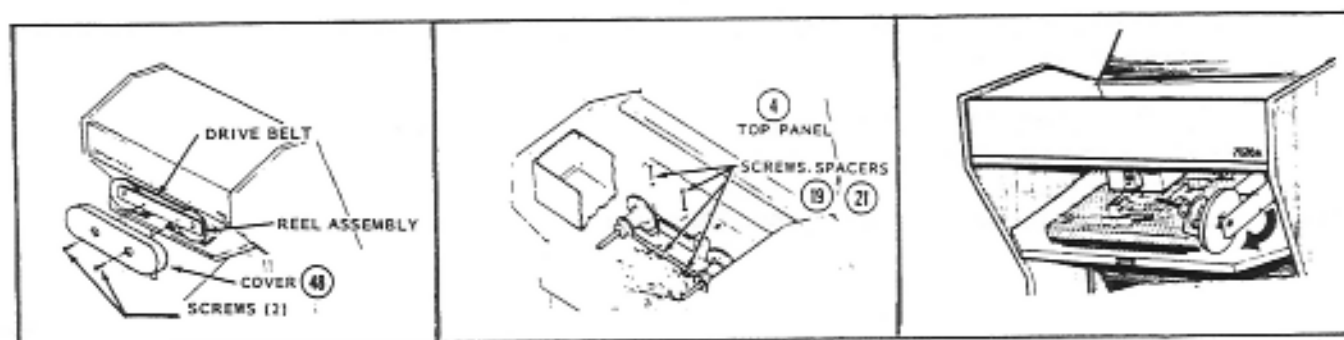
(See illustration)

Rotate the upper reel assembly until the reel shaft is pointed toward the rear of the 2020. Remove the two Phillips screws mounting the cover (item 48) to the assembly and remove the cover.

Slip the exposed drive belt off of the large pulleys and rotate the reel assembly 180°.

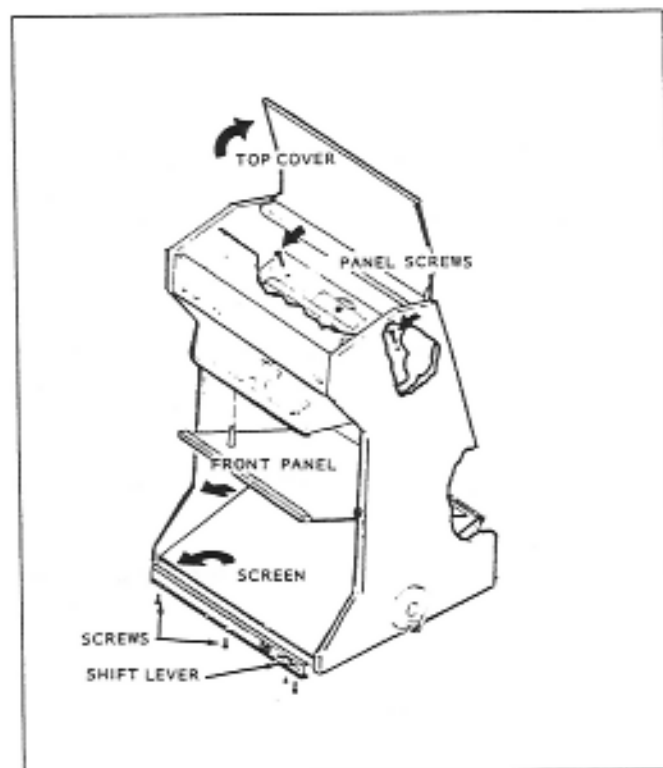
Open the top panel (item 4, page 6) and place your screwdriver through the opening to remove two screws and two spacers (items 19 & 21, Page 14)

Carefully ease assembly around the black light box.

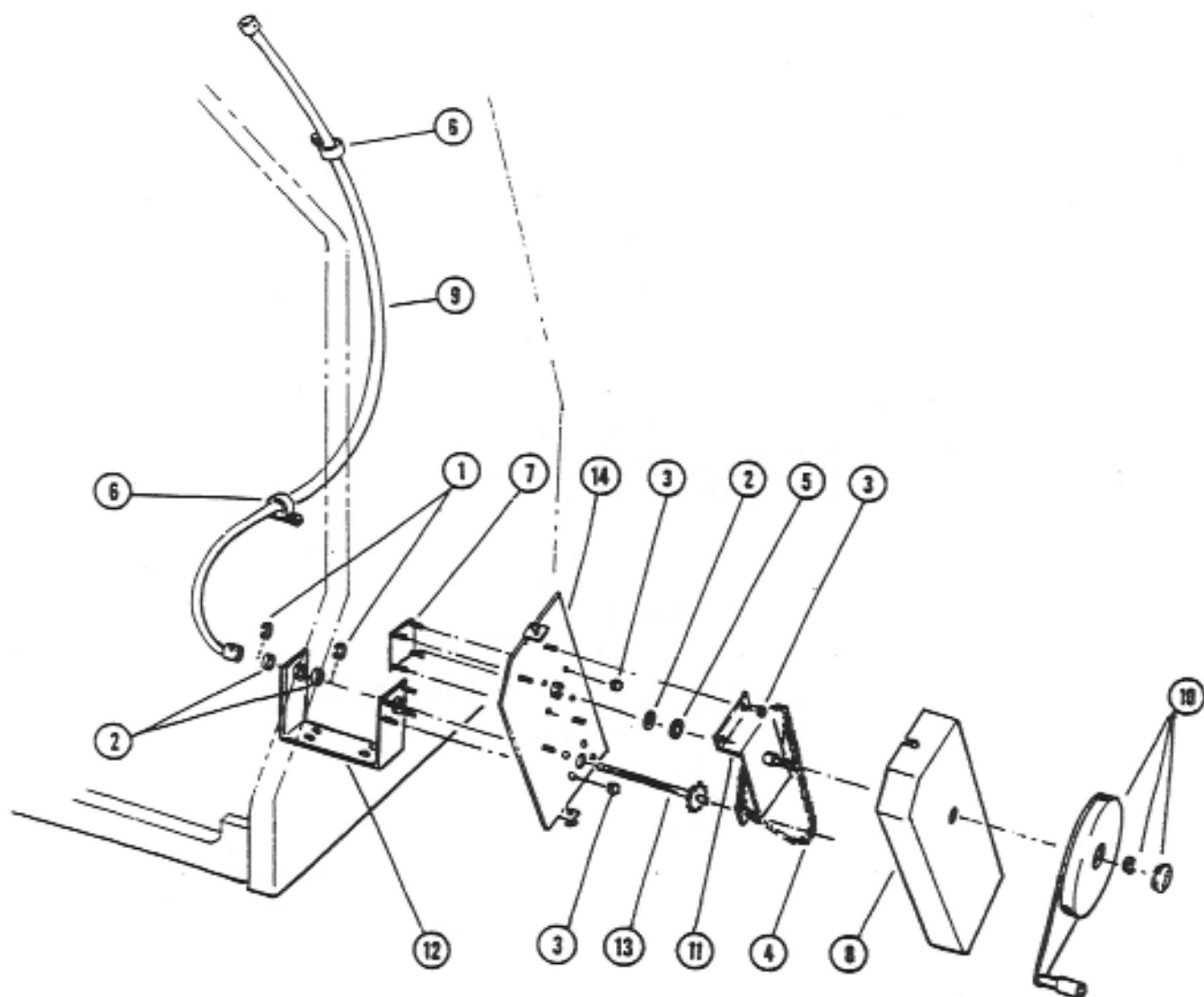


FRONT PANEL AND SCREEN REMOVAL

Place unit on a strong table. Remove the two (2) front panel screws. The heads of these screws are accessible from the top of the unit by opening the top cover. Remove the three front screws and the shift lever knob to remove the screen.



CABLE DRIVE ASSEMBLY



ITEM	PART NO.	DESCRIPTION	QTY
1	0022000	"E" CLIP	2
2	00275000	NYLON WASHER	3
3	00333000	6-32 KEPS NUT	12
4	03094003	DRIVE CHAIN	1
5	15705000	WAVE WASHER	1
6	16711003	CABLE CLAMP	2
7	21962000	BACKING PLATE	1
8	21967000	DRIVE COVER	1
9	21972000	DRIVE CABLE	1
10	21976000	HANDLE ASSEMBLY	1
11	22013000	DRIVE SHAFT ASSEMBLY	1
12	22014000	BEARING BRACKET ASSEMBLY	1
13	22022000	LOWER SHAFT ASSEMBLY	1
14	22025000	DRIVE PLATE ASSEMBLY	1

THIS PAGE IS AN ADDENDUM TO 2020
OPERATING MANUAL #7836 , PAGE 11
9-16-91

NMI 2020 CLUTCH ADJUSTMENTS (For reference see page 14)

After changing either the rear or front clutches on either shaft of the upper reel assembly of the 2020 rollfilm reader, gap settings and brake adjustments must be made:

There are basically two places in each clutch area where the gap settings are critical.

CLUTCH PADS When the clutches are disengaged, measure gap between the clutch pads. Gap should measure $.015 \pm .001$. If adjustment is required, loosen the setscrew on the collar behind the rear pulley and position it to obtain the proper gap. Tighten the setscrew securely.

CENTER CLUTCH The second gap setting is between the rear pulley and the ramp area of the center clutch. Turn the pulley to engage the clutch pads. (See Illustration #1) Use a pin gauge to check the gap. The gap should measure $.080 \pm .001$. If a pin gauge is not available to you, a visually estimated adjustment can be made. The gap between the right angles of the clutches should appear square. This setting can be altered by loosening the set screw in the collar behind the rear pulley and repositioning it to obtain the proper gap setting.

After the gaps have been set, assemble the upper reel assembly to the transport. The brake straps may now be adjusted.

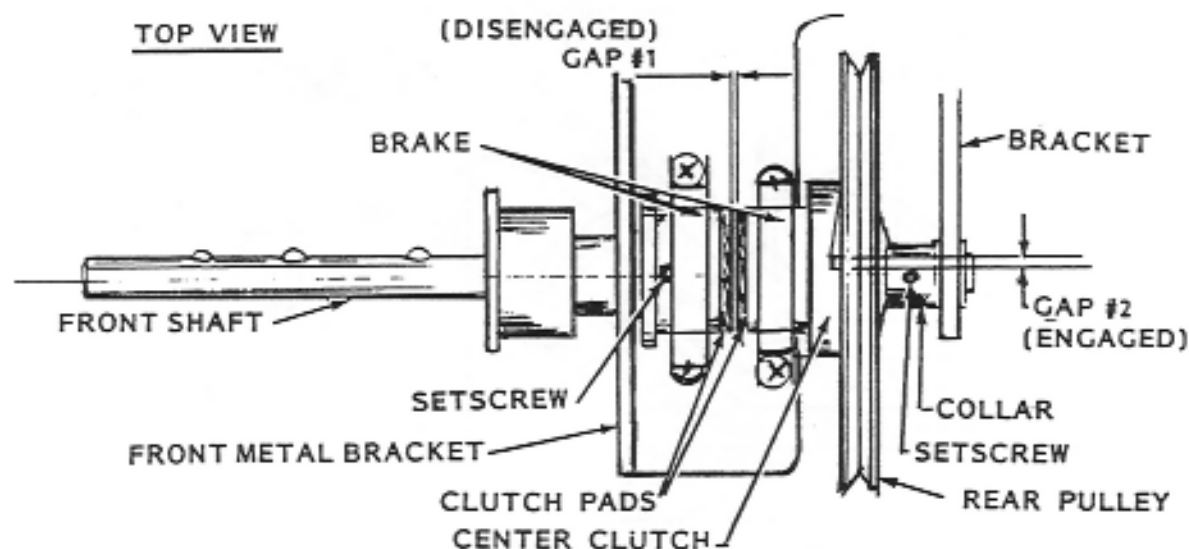


Illustration #1

REAR BRAKE The function of the rear brake is to provide a slight resistance to the center clutch, enabling the ramp drive action to occur. If the brake is too loose, you may turn the crank continuously but the film will not advance. If the brake is too tight, the film will drive, however it may be very difficult to turn the crank.

FRONT BRAKE The function of the front brake is to provide film tension during rewind, to prevent over travel or looping.

To loosen the brake tension, loosen lock nut on the bottom side of the bracket. Turn the adjustment screw counter clockwise. (Illustration #2)

To tighten the brake, turn it clockwise.

Tighten the lock nut against the bracket after adjustment is made. This nut ensures that the brake adjustment isn't altered during normal operation of the 2020.

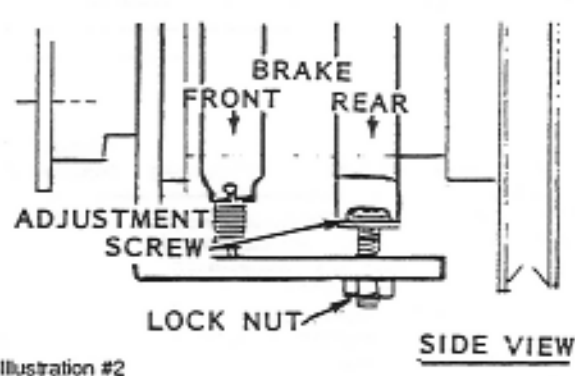
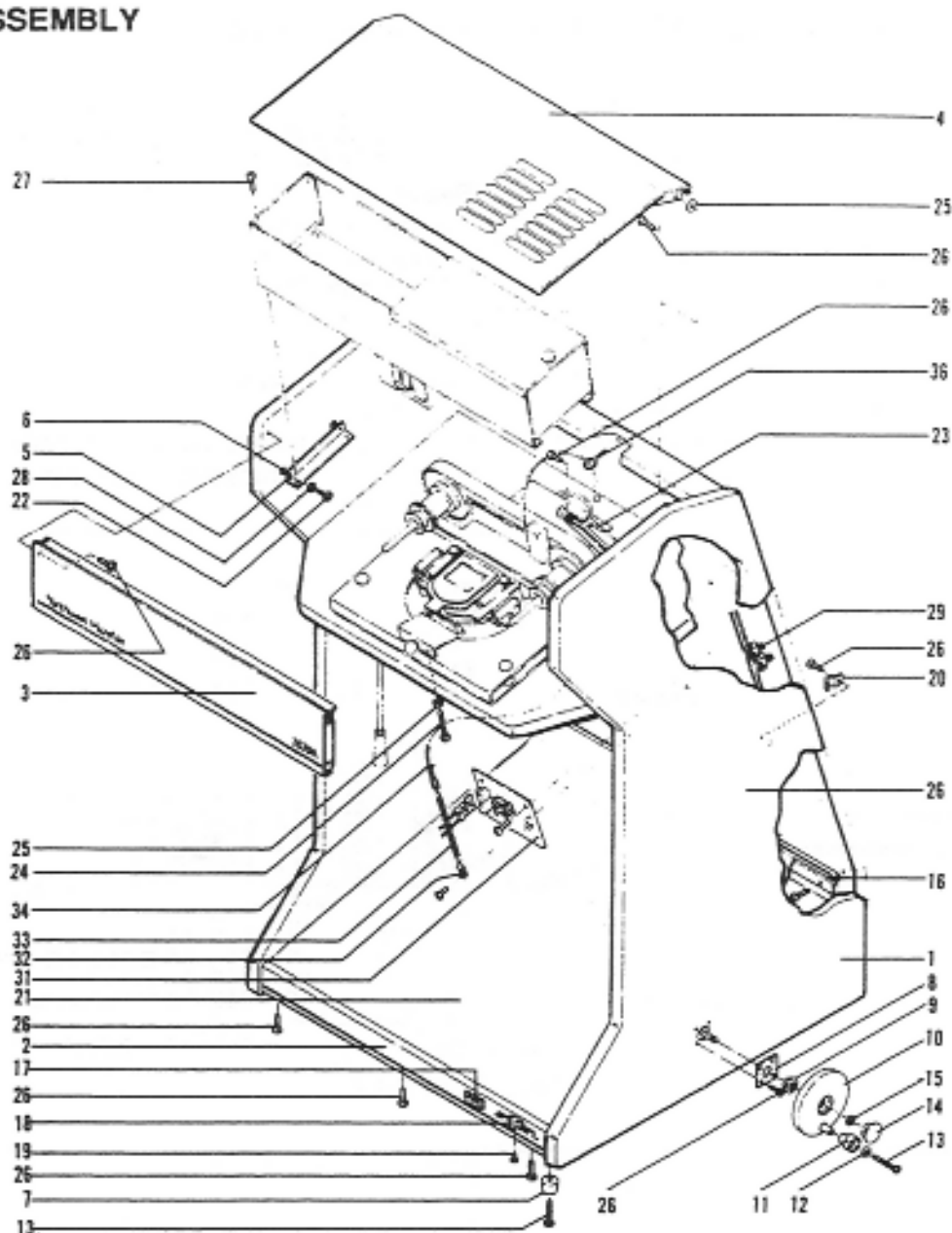


Illustration #2

Your brake adjustment should be able to meet the following criteria:

1. Having to turn the crank a half turn (180°) before engagement takes place is allowable when changing film direction.
2. A pull of 25 ounces is the maximum difficulty allowed when turning the crank.
3. One quarter free turn of the reel is acceptable over travel.

CABINET ASSEMBLY

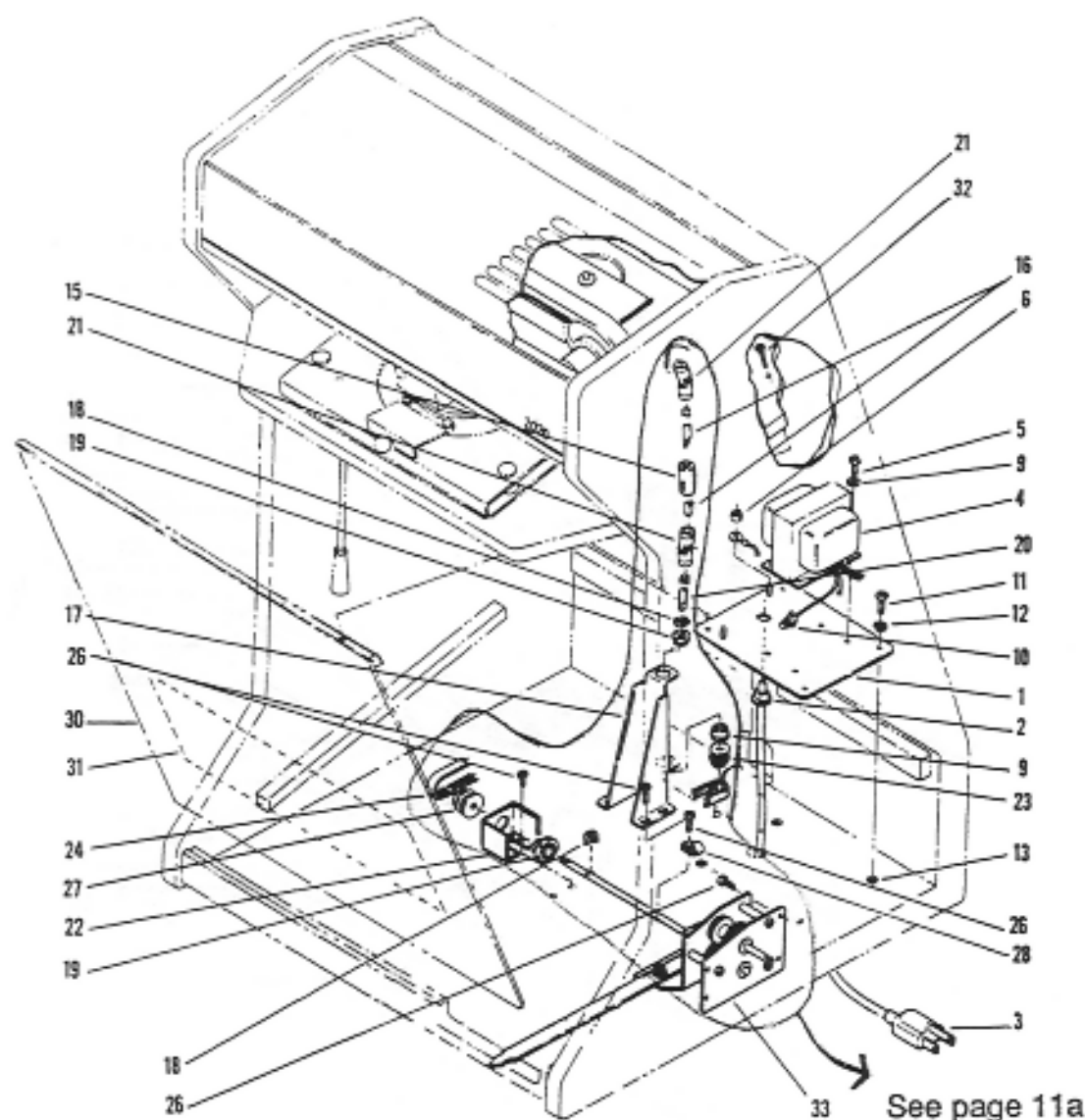


ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
1	6470	CABINET ASSEMBLY	1
2	6479	FRONT - COVER - Screen Assembly	1
3	6483	PANEL ASSEMBLY Top, 2020	1
4	6185	COVER ASSEMBLY	1
5	3315	BRACKET, Lamp Housing	2
6	2444	THREADED INSERT #10-24	4
7	2201	BUMPER, Recess	4
8	3781	PLATE - MOUNTING - Bearing	1
9	3779	BALL BEARING, Flanged	1
10	3778	HAND WHEEL	1
11	3797	KNOB, Hand Crank	1
12	2454	WASHER, FLAT	1
13	2436	SCREW, #8x1-1/4" Phillips Pan Hd. AB	5
14	2430	HOLE RING	1
15	2441	RETAINING RING, 1/4" Shaft	1
16	3758	SUPPORT, Rear Screen	1
17	6476	SWITCH, Rocker Wire Leads Assembly	1
18	3795	KNOB, Shift Arm	1
19	2075	SCREW, #5x1/4" Phillips Pan Hd. TYPE B	1
20	2208	CLAMP, Cable	1

ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
21	3800	SCREEN	1
22	2446	SCREW, #10-24x1/2" Phillips Pan Hd.	4
23	3323	COVER, Lamp Leads	1
24	2126	SCREW, #8-32 x 3/4" Phillips Pan Hd.	3
25	2065	WASHER, Flat #8, Black	5
26	2227	SCREW, #8x5/8" Phil. Pan Hd. Type AB	21
27	2226	SCREW, #8-32x1/4" Phillips Hd. Type 23	4
28	2261	WASHER, Lock #10	4
29	5507	WIRE NUT	2
30	2163	#8 x 1/2", Phillips Pan Hd. Type AB	2
31*	6217	PRINTED CIRCUIT BOARD ASSEMBLY	1
32*	2271	CABLE CLAMP	1
33*	2267	EXTENSION SPRING	1
34*	6263	LEAD WIRE ASS'Y	2
35*	2220	SCREW	1
36*	2274	EYE SCREW	1

* 2020A Only

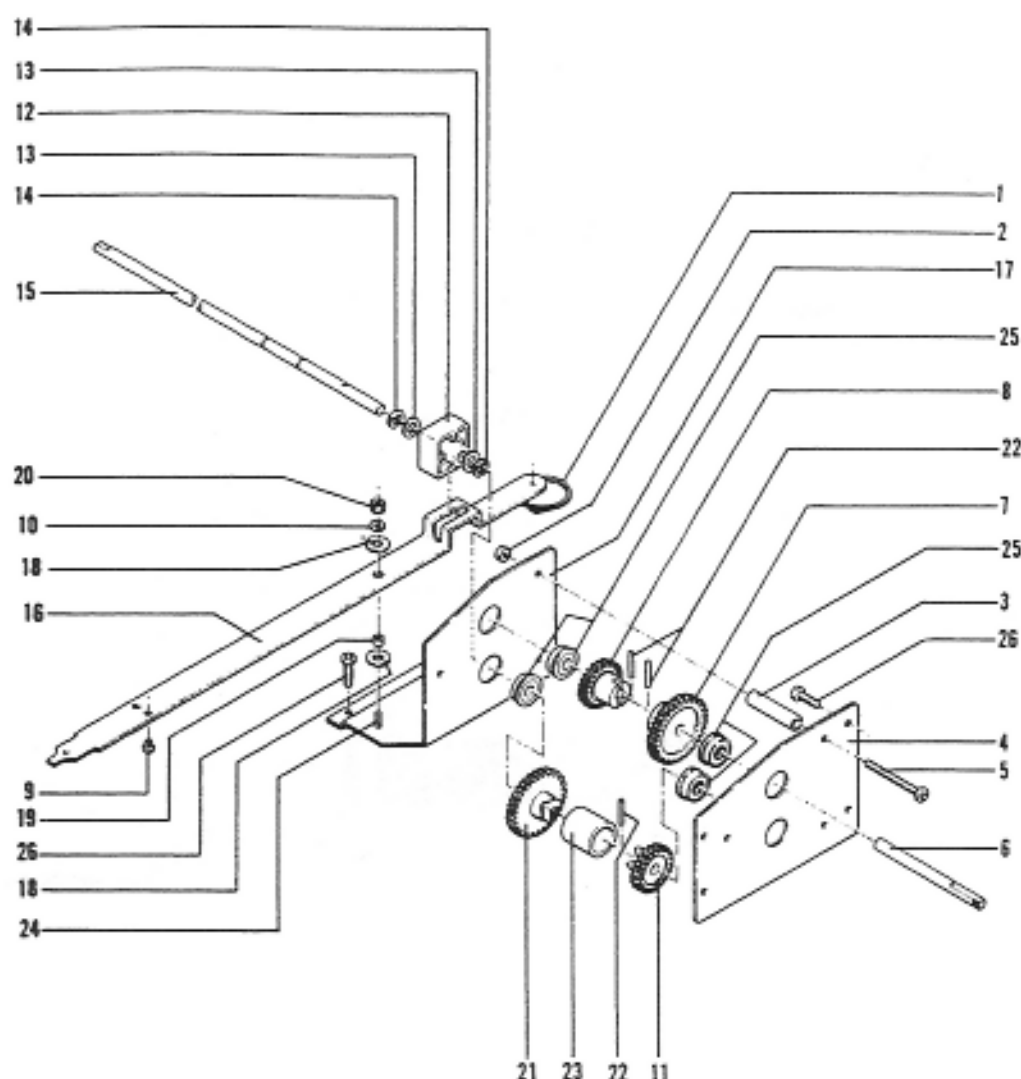
DRIVE ASSEMBLY



ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
1	6474	MOUNTING PLATE	1
2	2004	STRAIN RELIEF BUSHING	1
3	6116-04	POWER CORD ASSEMBLY	1
4	657701	TRANSFORMER 117V 60 Hz	1
	657702	TRANSFORMER 240V 50 Hz	1
5	2164	SCREW, #8 x 3/8" TYPE AB	4
6	93170	NUT KEPS	1
9	2065	WASHER, FLAT #8 BLK	4
10	5507	WIRE NUT	4
11	2446	SCREW, #10-24 X 1/2" PH	4
12	2261	LOCK WASHER, #10	4
13	2444	THREADED INSERT, 10-24	4
14	2159	SETSCREW, #6-32 X 1/4"	1
15	20135000	COUPLING, SLIDE	1
16	20136000	DRIVE SHAFT	2

ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
17	3756	BEARING SUPPORT, REAR	1
18	2094	RETAINING RING	1
19	3779	BALL BEARING, FLANGED	3
20	3780	SHAFT, REAR	1
21	3764	UNIVERSAL JOINT	2
22	3841	SUPPORT BRACKET, BEARING	1
23	377401	PULLEY, REAR TIMING 36 T	1
24	20124000	TIMING BELT	1
26	2227	SCREW, #8 X 5/8" TYPE AB	12
27	377501	PULLEY, FRONT TIMING 26 T	1
28	2208	CABLE CLAMP	1
30	6470-9	FRONT PANEL	1
31	2860	LABEL, OPERATING INSTRUCTIONS	1
32	2192	#6 X 1 PH	2
33	6473	GEARBOX ASSEMBLY	1

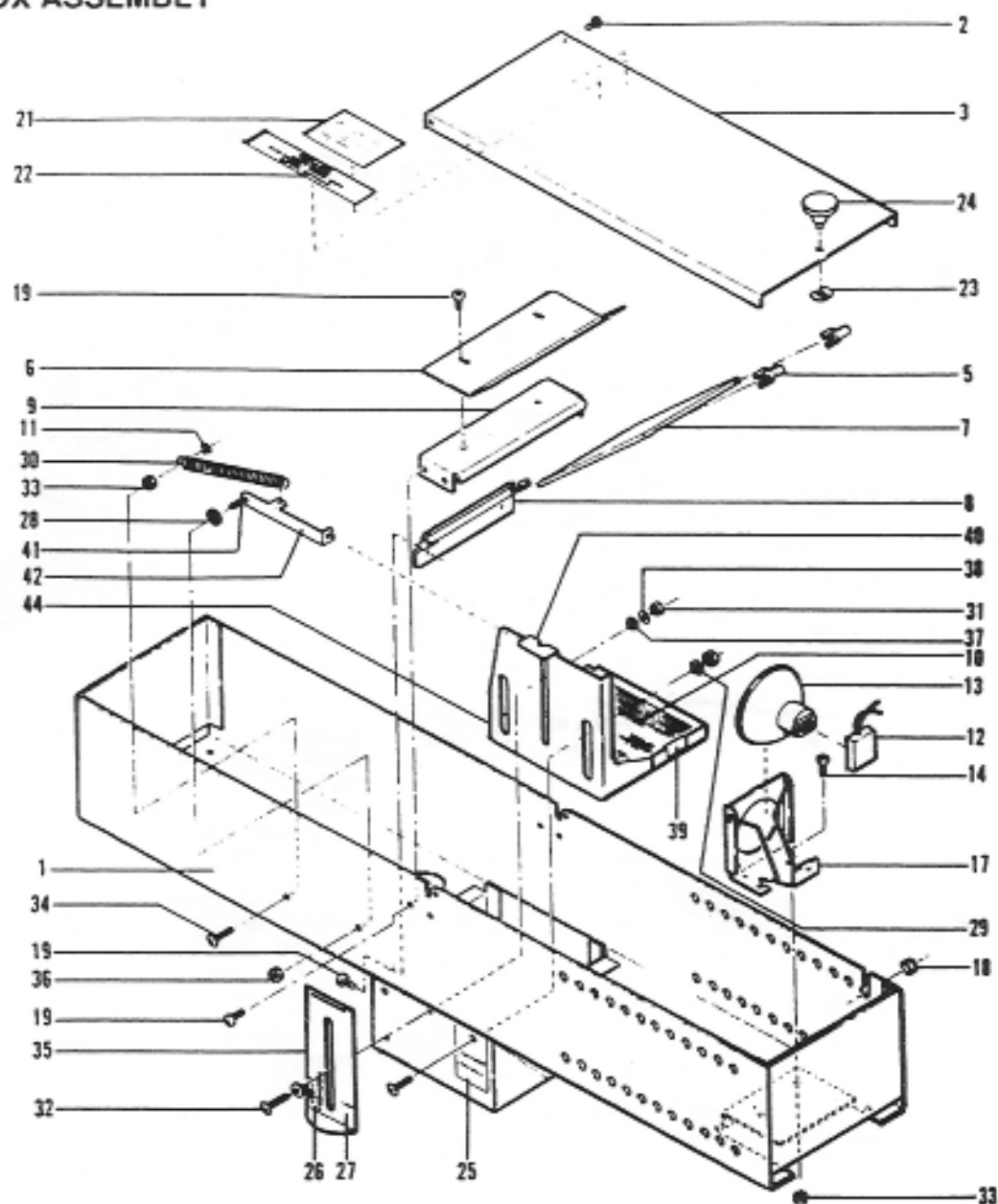
GEAR BOX ASSEMBLY



ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
1	3504	SPRING, Shift	1
2	2160	NUT, Keps #8-32	3
3	2432	SPACER, 1-5/16" Lg. x 3/8" O.D.	3
4	3754	PLATE, Gear Box, Mounting	1
5	2165	SCREW, Phillips Hd, #8-32 x 1-3/4"	3
6	3749	SHAFT, Crank	1
7	3771	GEAR, Spur 48 Tooth	1
8	3770	GEAR, Spur 34 Tooth	1
9	2431	PLASTIC PLUG, Dome Head	2
10	2229	WASHER, 3/8" O.D. x 5/32" I.D. x .030 Thk	1
11	3773	GEAR, Main Drive 34 Tooth	1
12	3748	YOKE, Main Drive	1
13	3241	SPACER, Close Tolerance	2
14	2378	RETAINING Ring (1/4" Dia)	2
15	3750	SHAFT, Lower Drive	1

ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
16	3753	SHIFT ARM	1
17	3755	PLATE, Gear Box	1
18	3610	SPACER	2
19	2433	SPACER, Pivot	1
20	2322	NUT, Keps #6-32	1
21	3772	GEAR, Main Drive 48 Tooth	1
22	21-0767	SPRING PIN (.062 Dia. x 5/8" Long)	3
23	3777	GEAR SLEEVE	1
24	90630	PEM STUD	1
25	3779	BALL BEARING, Flanged	4
26	2227	SCREW, #8x5/8" Phillips Pan Hd. AB	6

LIGHT BOX ASSEMBLY

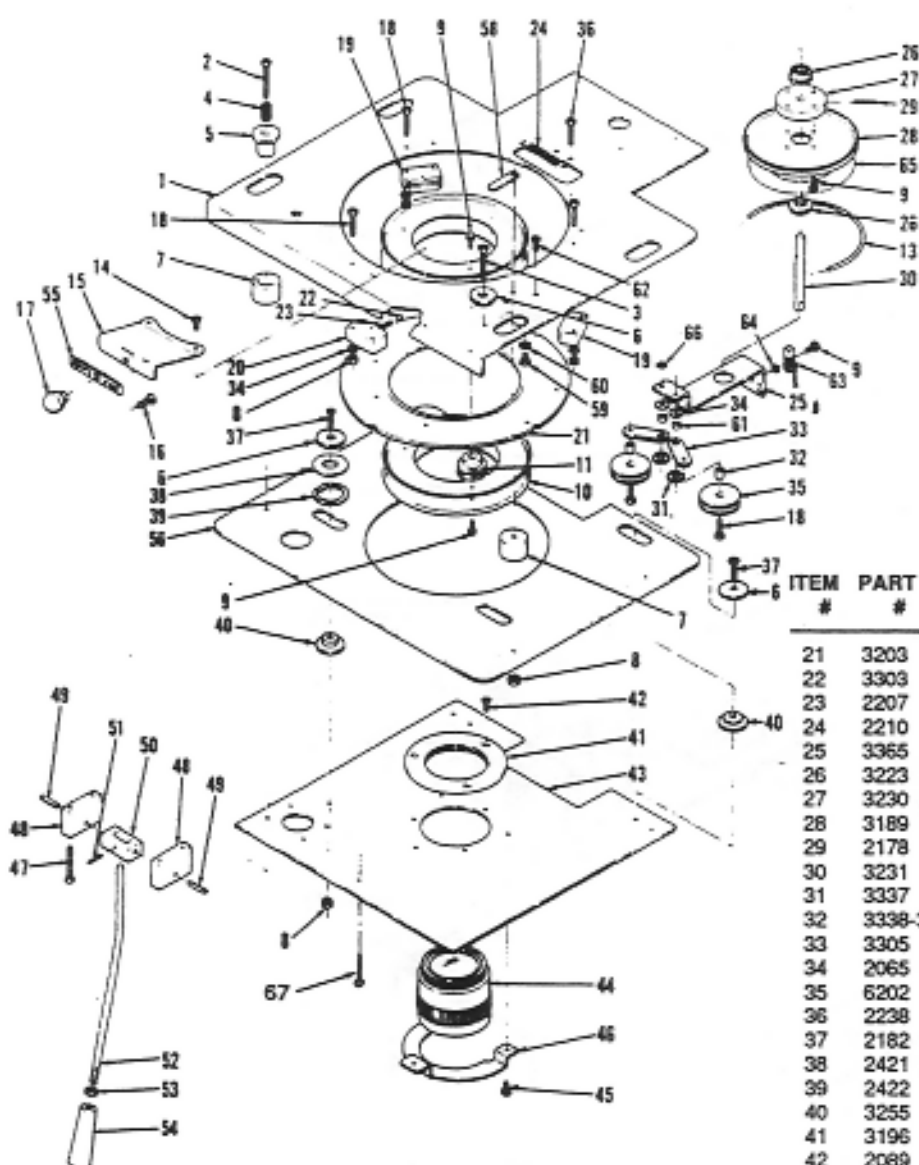


ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
1	*6439-01	LAMP HOUSING ASS'Y w/Adj. Cond.	1
2	2100	SCREW, #4 x 1/4" Phil. Hd. Type "B"	2
3	3319	COVER, Lamp box	1
5	3270	CLIP, Mirror retainer	2
6	3317	SUPPORT, Mirror	1
7	2652	MIRROR, Front surface	1
8	3320	BRACKET, Mirror support	1
9	3318	SUPPORT, Mirror holder	1
10	5042	CONDENSER, 2020	1
11	2390	RING, Retaining	1
12	5540-1	SOCKET, Lamp	1
13	6230	LAMP, Photo, DED	1
14	2069	SCREW, Phillips Hd., #6-32 x 1/4"	2
17	5519	BRACKET, Lamp, QEX-10	1
18	2095	BUSHING, Snap-In	1
19	2226	SCREW, Phil. Hd. Type 23 #8-32x1/4"	6
21	2670	WARNING & Replacement Lamp Label	1
22	2518	WARNING LABEL	1
23	2286	CLIP, Retaining	1
24	2287	KNOB, Cover	1

ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
25	2867	LABEL, Light Positioning	1
26	2865	LABEL, Light Control	1
27	2866	LABEL, Light Indicator	1
28	2318	WASHER, Nylon Shoulder	1
29	2328	WASHER, Nylon Shoulder	2
30	2346	SPRING, Extension	1
31	2315	NUT, Keps. #4-40	4
32	2343	SCREW, #4-40 x 3/8" Phil. Truss Hd.	4
33	2322	NUT, Keps. #6-32	3
34	2399	SCREW, #6-32 x 1/2" Phil. Pan. Hd.	1
35	3545	ACTUATOR, Lens Moving	1
36	92244	HEX NUT, Locking	1
37	2420	WASHER, Shoulder	4
38	2338	WASHER, #4 Flat	2
39	2340	CLIP, U-Shape Tinnerman	2
40	3537	BRACKET, Lens Support - Adjustable	1
41	90630	#6-32 x 3/8" STUD. Self-Clinging	1
42	6437	LEVER, Lens Holding	1

*6439-02 for 2020A Only

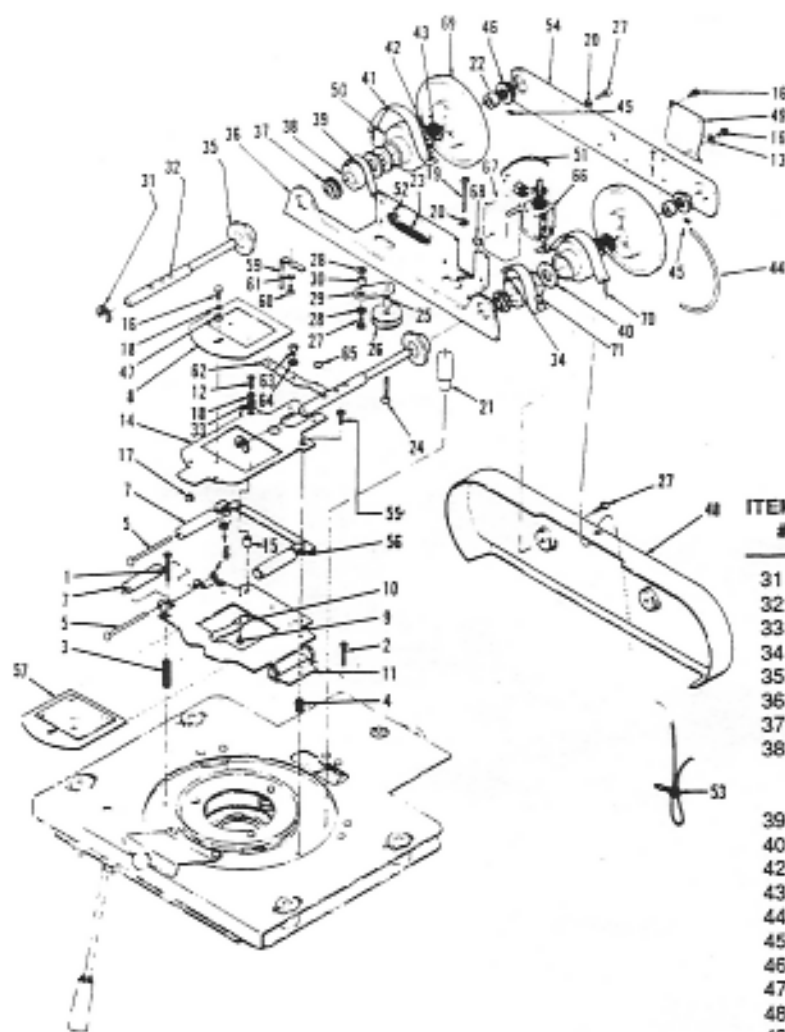
FILM TRANSPORT ASSEMBLY SHEET 1



ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
1	3204-1	TABLE, Roller	1
2	2191	SCREW, Phil. pan Hd., #8-32 x 1"	2
3	2189	SCREW, Phil. pan Hd., #8-32 x 1-1/4"	2
4	2174	SPRING, Compression	2
5	3218	INSERT, Table guide	2
6	3219	GUIDE, Table	8
7	3217	BUSHING, Table guide	4
8	2160	NUT, Keps #8-32	14
9	2140	SCREW, Hex Hd., Sems #4-40	9
10	3211	PULLEY, Half, upper carrier	4
11	6200	ROLLER, Carrier Pulley Assembly	3
12	3739	WASHER, Table 2020	2
13	3221	BELT, Drive, lower	1
14	2106	SCREW, Phil. pan Hd., #4-40 x 3/16"	2
15	3366	HANDLE	1
16	2067	SCREW, Phil. pan Hd., #8-32 x 5/16"	1
17	3368	KNOB	1
18	2126	SCREW, Phil. pan Hd., #8-32 x 3/4"	8
19	3216-1	GUIDE, Ring, locating	2
20	3216-1	GUIDE, Ring, locating	1

ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
21	3203	RING, Carrier	1
22	3303	BALL, Detent	1
23	2207	SPRING, Detent, compression	1
24	2210	SPRING, Extension, lower tensioner	1
25	3365	BRACKET, Support	1
26	3223	BEARING, Ball, flanged	2
27	3230	HUB, Driving pulley	1
28	3189	DRIVING PULLEY SUB-ASSEMBLY	1
29	2178	PIN, Spring	1
30	3231	SHAFT, Driving pulley	1
31	3337	HEX Nut, Take-up	2
32	3338-3	SPACER, Take-up	2
33	3305	PLATE, Take-up	2
34	2065	WASHER, Flat, #8	11
35	6202	PULLEY, Idler Assembly, lower	2
36	2238	#10-32x1/2" Phil. pan Hd., Swageform	2
37	2182	#8-32 x 5/8" Phil. pan Hd., M.S.	2
38	2421	WASHER, Wave Spring	2
39	2422	#8-32 x 3/4" Phillips flat Hd., M.S.	2
40	3255	PAD, Guide	4
41	3196	RING, Lens mounting	1
42	2089	SCREW, Phil. flat Hd., #8-32 x 1/4"	3
43	3194	PLATE, Mechanism, mounting	1
44	*	LENS, Objective, (See Below)	1
45	2188	CAP SCREW, Socket Hd., #8-32 x 1/4"	3
46	3266-1	GUARD, Objective lens	1
47	2206	CAP SCREW, Socket Hd., #8-32 x 1"	4
48	3278	BLOCK, Trunnion	2
49	2169	PIN, Spring, .187" x .687"	2
50	3273	BLOCK, Scan pivot	1
51	2196	PIN, Spring, .094" x .625"	1
52	3254	ROD, Scan lever	1
53	2153	NUT, Hex head, 1/4" x 20	1
54	2176	HANDLE, Tapered	1
55	2701	LABEL, Image rotation	1
56	3193	TABLE, Support	1
58	3361	STOP ARM	1
59	2264	#10-32 x 5/16" Phillips pan Hd., M.S.	1
60	2066	#10 FLAT WASHER	1
61	3304-1	SPACER TAKE UP	1
62	2124	#6-32 x 1/4" Phillips pan Hd., type 23	2
63	5627	OPTICAL SENSOR	1
64	2032	FLAT WASHER	1
65	2700	OPTICAL DISC	1
66	2278	SPRING, Hold Down	2
67		SCREW, Mounting Plate	3
*5012		Lens, Objective, 35mm or 5015 Lens, Objective, 24mm or 5020 Zoom Lens, Objective, 28mm-50mm.	
*5043		Lens, 16.5mm. Zoom Lens Guard - 3392.	

FILM TRANSPORT ASSEMBLY SHEET 2

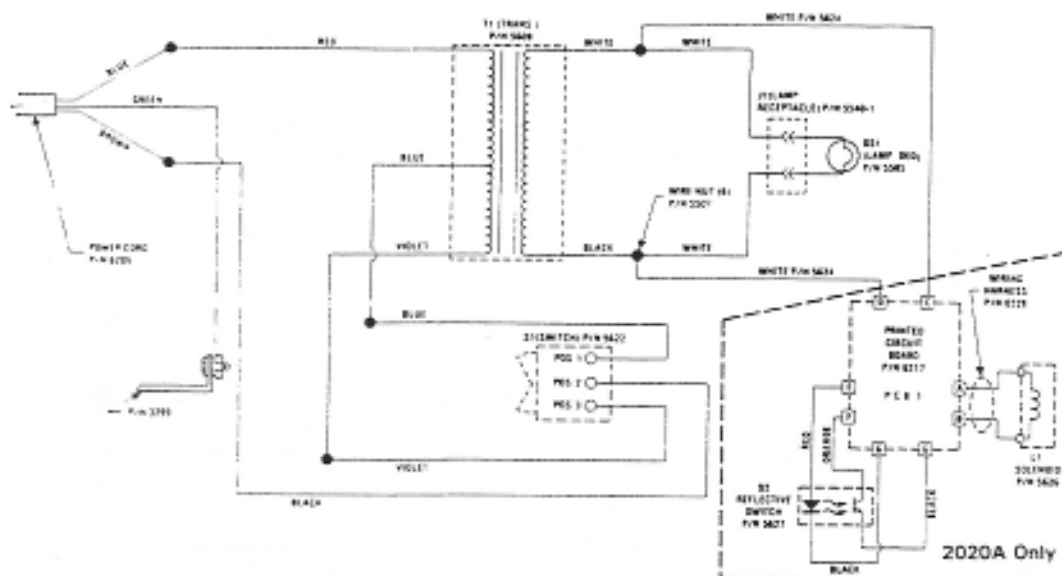


ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
1	2189	SCREW	2
2	2182	SCREW	1
3	2184	SPRING, Compression	2
4	2174	SPRING, Compression	1
5	3274	AXLE, Film roller	4
6	3225	RING, Retaining	4
7	3277	ROLLER, Film	4
8	6496	UPPER GLASS ASSEMBLY	1
9	2162	SCREW	2
10	3261	SPRING, Glass retaining	2
11	3205	FRAME, Lower glass	1
12	2055	SCREW	2
13	2064	WASHER, Flat head #4	2
14	3192-1	FRAME, Upper glass	1
15	3253-1	LOCATOR, Upper glass frame	2
16	2140	SCREW, Hex head	5
17	3257	SPACER, Upper frame	2
18	2229	WASHER, Flat	2
19	2165	SCREW	2
20	2172	LOCKWASHER	5
21	3243	SPACER, Carrier support locator	2
22	3280	COLLAR	2
23	2211	SPRING	1
24	2248	SCREW	2
25	3338-4	SPACER, Take-up	2
26	6206	PULLEY, Idler assembly upper	2
27	2037	SCREW	7
28	2065	WASHER, Flat #8	4
29	3305	PLATE, Take-up	2
30	3304-1	SPACER, Take-up	2

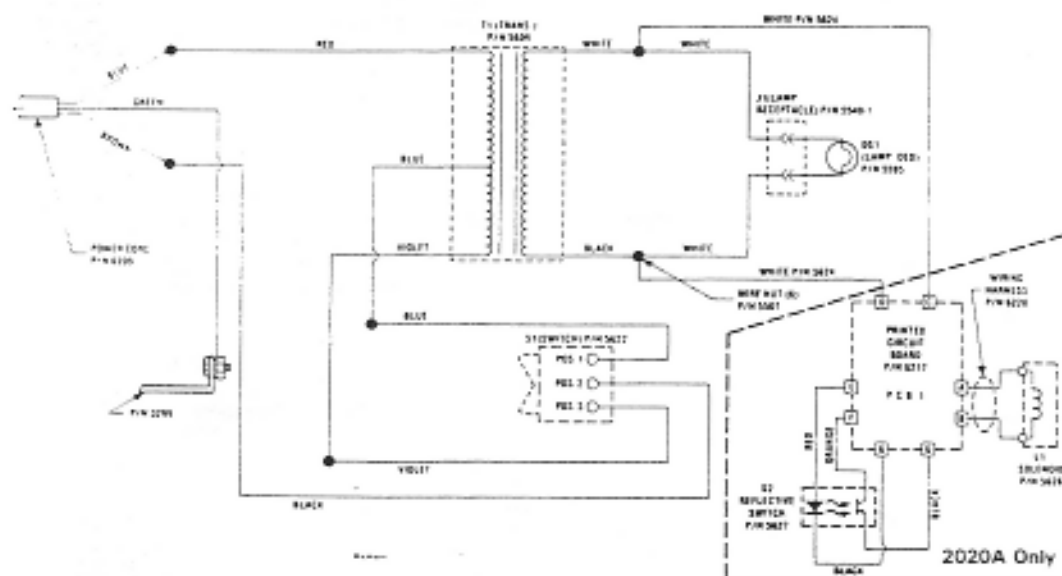
ITEM #	PART #	DESCRIPTION	QUANTITY REQUIRED
31	2228	RING, E	2
32	6223	REEL SHAFT ASSEMBLY	2
33	2268	SPRING, Compression	1
34	21-0768	SPRING, Front tensioner	2
35	3371	STOP, Front	2
36	3835	BRACKET, Support	1
37	3779	BEARING	2
38	3826	PULLEY	2
	3846	CLUTCH PAD	2
	2159	SCREW SET	2
39	20127001	CLUTCH TENSIONER	2
40	295101	PAD, O	2
42	2441	RING, E	2
43	3241	SPACER	4
44	3222	BELT, Upper drive	1
45	2159	SCREW, Set	2
46	3779	BEARING	2
47	2234	#4-40 HEX NUT	1
48	3212-1	COVER, Pulley/belt	1
49	3271	CLIP, Upper glass open	1
50	3825-1	CLUTCH, Left	1
	3825-2	CLUTCH, Right	1
51	6228	HARNESS	1
52	2278	SPRING, Hold down	2
53	5512	WIRE TIE	2
54	3233	SUPPORT BAR 2020M	1
	3233-1*	SUPPORT BAR 2020A	1
55	2106	SCREW	2
56	3393	SUPPORT, Film roller	1
57	6495	LOWER GLASS ASS'Y	1
59	3362*	BRACKET, L	1
60	2163*	SCREW	1
62	3363*	ARM, Auto lift	1
63	2124*	SCREW	2
64	2125*	WASHER	2
65	2272*	PAD, Felt	1
66	5826*	SOLENOID	1
67	3364*	COVER, Solenoid	1
68	2140*	SCREW, Solenoid	2
	2062*	WASHER, Solenoid	2
69	3824-1	PULLEY, Left	2
	3824-2	PULLEY, Right	1
	3827	COVER, Clutch (Part Not Shown)	2
70	210768	SPRING, Rear tensioner	2
71		SCREW	4
	6576	FILMGATE ASS'Y. COMPLETE 2020M	
	6576-01	FILMGATE ASS'Y. COMPLETE 2020A	
	6558	LEFT CLUTCH DISC ASSEMBLY	
	6559	RIGHT CLUTCH DISC ASSEMBLY	
	6536	UPPER REEL ASSEMBLY 2020M	
	6536-01	UPPER REEL ASSEMBLY 2020A	

*2020A Only

SCHEMATIC 117V 60HZ



SCHEMATIC 240V 50HZ



MICROIMAGE

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